

Remarks/Arguments

A. Status of the Claims

Claim 28 is amended and claim 41 is cancelled. Support can be found throughout the specification and claims as originally filed. Claims 22-24 and 28-40 and 42-43 are pending.

B. The Indefiniteness Rejection Is Overcome

Claims 28 and 41 are rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness. The Examiner contends:

The first prepolymer of claim 28 renders the claim indefinite and fails to further limit claim 22, because the lower end of the average molecular weight range cannot be obtained when the values of x and y are 1 or less; furthermore, such compounds would not be the required polysulfide.

The subject matter of claim 41 fails to further limit claim 22, because the “at least one S atom in its chain” limitation fails to satisfy the requirement that the dithiol prepolymer must be a polysulfide.

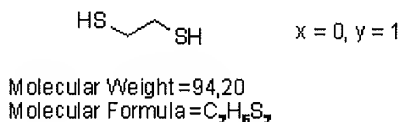
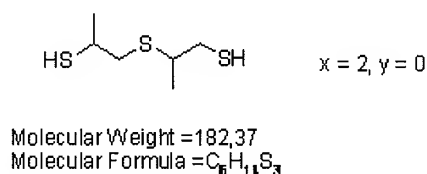
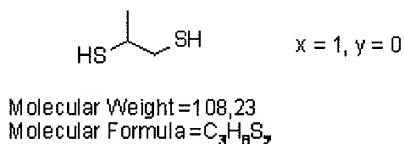
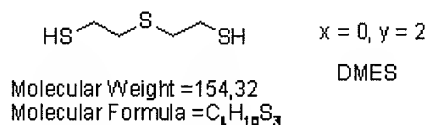
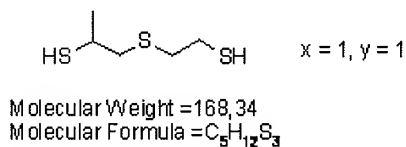
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Applicant disagrees with the rejections. A person of ordinary skill in the art would understand the claims when read in light of the specification. However, in an effort to further prosecution and secure prompt allowance, claim 41 is cancelled.

With respect to claim 28, the Examiner is focusing the rejection on the first (of three) Markush Group. A person of ordinary skill in the art would understand the scope of this claim by reading the plain language of the claim. For instance, it is clear that the x and y integers in claim 28 are selected in such a manner that results in a compound that:

- is a pre-polymer;
- is a polysulfide; **and**
- has a molecular weight ranging from 100 to 3000 g/mol.

See claim 28. Stated another way, the plain language of claim 28 makes it clear that when a pair of integers are selected (x, y) that results in a compound that does not include all three of the above properties, the compound falls outside the scope of claim 28. See MPEP § 2173 (explaining that “[t]he primary purpose of this requirement of definiteness of claim language is to ensure that the scope of the claims is clear so the public is informed of the boundaries of what constitutes infringement of the patent.”). The following are examples of compounds that fall outside the scope of claim 28:



A person of ordinary skill in the art of prepolymer chemistry would be able to identify a pair of integers (x, y) that results in a compound having Applicant's claimed elements (*i.e.*, a polysulfide pre-polymer having a molecular weight ranging from 100 to 3000 g/mol). Similarly, such a person would be able to identify a pair of integers (x, y) that does not result in Applicant's claimed compound. This can be done by simply reading the plain language of claim 28 alone, or in the context of the present invention, which confirms that the claim is definite. See MPEP §

2173.02 (“In reviewing a claim for compliance with 35 U.S.C. 112, second paragraph, the examiner must consider the claim as a whole to determine whether the claim apprises one of ordinary skill in the art of its scope and, therefore, serves the notice function required by 35 U.S.C. 112, second paragraph, by providing clear warning to others as to what constitutes infringement of the patent.”).

Claim 28 is definite for at least the reasons discussed in the above paragraphs. Therefore, Applicant requests that the rejection be withdrawn.

C. The Anticipation Rejections Are Overcome

The Examiner maintains the two previous anticipation rejections for claims 22-24, 29, 30, 33-35, 38, and 40-43 in view of WO 01/36507 and WO 01/36508 (the ‘507 and ‘508 Publications, respectively). The Examiner contends:

Applicants’ argued definition of prepolymer allows for the prepolymer to be an oligomer, and it is noted that claim 7 specifically allows for oligomers of the specified thiols, and the position is taken that such oligomers would inherently encompass polysulfides. Applicants have not conclusively established that the disclosed oligomers are not within or encompassed by the argued prepolymers.

Action at page 3. According to the Examiner, an oligomer of the 2,2’-thiodiethanethiol (DMES) monomer in claim 7 of the ‘507 and ‘508 Applications would encompass Applicant’s claimed prepolymer. *Id.* at 2-3.

Applicant disagrees. The ‘507 and ‘508 Publications fail to disclose Applicant’s claimed polysulfide “prepolymer being free from disulfide (-S-S-) linkage.” *See* claim 22. In fact, the Examiner has not cited to a single oligomer in these references that meets Applicant’s claimed polysulfide prepolymer. *In re Sun*, 31 U.S.P.Q.2d 1451, 1453 (Fed. Cir. 1993) (explaining that

the examiner bears the burden of showing that “the prior art reference, disclose[s], either expressly or under the principles of inherency, every limitation of the claim.”); *see also In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (in finding no anticipation by inherency, the Federal Circuit explained “[t]o establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.”).

The following subsections explain that the oligomers of the polythiol monomers in the ‘507 and ‘508 Applications necessarily have disulfide linkages. Therefore, an oligomer of DMES would not encompass Applicant’s claimed polysulfide prepolymer because such an oligomer would have a disulfide linkage.

Polymerization of the polythiol monomers in the ‘507 and ‘508 Publications results in oligomers having disulfide linkages

The ‘507 and ‘508 Publications explain in their respective disclosures that polymerization of polythiol monomers (including DMES) results in an oligomer having at least one disulfide linkage.¹ For instance, the ‘507 Publication explains that oligomers of polythiol monomers are formed by oxidative coupling of thiols groups. *Id.* at 7, lines 31-37, to 8, line 9. This results in the formation of disulfide linkages. *Id.* at 7, lines 32-34 (“Such an oxidative coupling can result in the formation of oligomeric polythiol species having disulfide linkages, *i.e.*, -S-S- linkages.”).

¹ The disclosures in the ‘507 and ‘508 Publications are substantially identical with respect to the anticipation rejections. In an effort to be efficient, all of the arguments focus on the ‘507 Publication. However, all of the arguments made against the ‘507 Publication equally apply to the ‘508 Publication.

In fact, when discussing polythiol monomers (including DMES) that can be used to prepare a polycyanate reactant product, the '507 Publication characterizes the resulting polythiol oligomer as having disulfide linkages:

The polythiol monomer used to prepare the polycyanate reactant may be a polythiol oligomer having disulfide linkages, which is prepared from the reaction of a polythiol monomer having at least two thiol groups and sulfur in the presence of a basic catalyst.

Id. at 7, line 35, to 8, line 2 (underline added). Applicant notes that the above cited passage uses the word "may." Any interpretation that this passage inherently discloses polysulfide oligomers that do not include disulfide linkages would be incorrect, as it would contradict the express teachings of the '507 Publication in at least two ways. First, the disclosed method of producing oligomers from the polythiol monomers necessarily results in an oligomer having a disulfide linkage (*i.e.*, oxidative coupling results in oligomeric species having disulfide linkages). This is confirmed by the following passage from the '507 Publication:

General formula Ia demonstrates that oligomerization can occur through disulfide bonds forming between any of the thiol groups in general structure I. Although all possibilities are not shown, general structure Ia is meant to represent all possible oligomers that can form from general structure I.

'507 Publication at 8, lines 16-20; *see also id.* at lines 21-23 (explaining that "[t]he basic catalyst used to prepare the polythiol oligomer having disulfide linkages may be selected from ammonia, amine and mixtures thereof.").

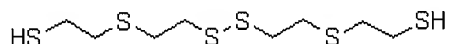
Second, it is clear from the ‘507 Publication that the use of the word “may” refers to the fact that either a polythiol monomer or a polythiol oligomer can be used to prepare the first component of the “two-component composition.” Stated another way, the first component can be the reaction product of a polythiol monomer or a polythiol oligomer (the oligomer necessarily having a disulfide linkage). Neither the monomer nor the oligomer lead to Applicant’s claimed polysulfide “prepolymer being free from disulfide (-S-S-) linkage.”

The above arguments clearly show that polymerization of the polythiol monomers in the

‘507 Publication necessarily results in an oligomer having at least one disulfide linkage.

Polymerization of DMES in the '507 Publication results in an oligomer having disulfide linkages

With the above framework in mind, and Contrary to the Examiner's position, polymerization of the DMES monomer disclosed in the '507 Publication results in an oligomer having a disulfide linkage. The following is an illustration of a compound having two DMES monomers combined *via* the "oxidative coupling of thiol groups" method described in the '507 Publication:



As is evident, the combination results in an oligomer having a disulfide (-S-S-) linkage. In fact, the presence of the disulfide linkage is consistent with **all** of the polythiol oligomers disclosed in the ‘507 Publication—*i.e.*, all of the disclosed polythiol oligomers have at least one disulfide linkage. *See* ‘507 Publication at 7, line 23, to 9, line 30.

Conclusion regarding the anticipation rejections

The '507 and '508 Publications explain in their respective disclosures that polymerization of polythiol monomers (including DMES) results in oligomers having at least one disulfide linkage. The disulfide linkage is the result of oxidative coupling of thiol groups between the monomers. Therefore, polymerization of the DMES monomer disclosed in the '507 and '508 Publications necessarily results in an oligomer having a disulfide linkage.


The '507 and '508 Applications fail to disclose at least one element of Applicant's claimed invention (*e.g.*, a polysulfide "prepolymer being free from disulfide (-S-S-) linkage"). Therefore, the anticipation rejections are overcome and should be withdrawn.

D. Conclusion

Applicant believes that the present document is a full and complete response to the Office Action mailed November 8, 2006. The present case is in condition for allowance and such favorable action is requested.

The Examiner is invited to contact the undersigned Attorney at (512) 536-3020 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,



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Date: February 7, 2007